What is claimed:

1. An increased stiffness of vehicle structure of a motor vehicle comprising

a main vehicle body **(20)** having at least one door aperture **(20.1, 20.1B, 20.1T, 20.1h, 20.1x)** therein;

a mating vehicle door **(8, 8B, 8T, 8h, 8x)**, generally representing a tailgate- **(8T)**, sliding side-, cargo-, liftgate door, trunk cover **(8x)**, hood **(8h)** or vehicle door **(8, 8B)**, whose door frame, hingedly secured to that vehicle body **(20)** for pivotal movement between an open and a closed position, is reinforced by door-frame members comprising at least two impact beams **(1, 7, 1B, 7B)**, spanning the door aperture, door-reinforcement members and at least one window-guide channel **(6, 6B, 6.1, 6.2, 6.1B, 6.2B, 6.1a, 6.2a, 6.1aB, 6.2aB)** to receive and guide a window pane;

vehicular couples, consisting of

the vehicle door & a vehicle roof **(17)**,

the vehicle door & a side rail **(18)**,

the vehicle door & a pillar and

the vehicle door & a flange **(21, 21T, 21h, 21x)** of the vehicle body **(20)**,

at least one of which is equipped with interengaging assemblies, each of which includes a key, arranged to one vehicular member of the vehicular couple, facing the other vehicular member, and a mating receptacle located thereon; and

adjusting mechanisms to reduce clearances between the adjustable keys and the mating receptacles to permissible tolerances, when the vehicle door is closed, to ensure engagement of the interengaging assemblies

thus distributing impact energy to the respective vehicular members, lowering stress thereof and preventing passengers from ejection out of the motor vehicle in the event of a real-world accident.

2. An increased stiffness of vehicle structure according to claim **1**, further comprising at least one pillar-reinforcement member **(17.3, 18.3, 23)**, mounted to a common pillar of the vehicle doors of a vehicle side in juxtaposition, to receive at least two engaging members of the interengaging assemblies in engagement with the mating engaging members thereof, when the juxtaposed doors are closed, where each mating engaging member is located on the respective door-frame member adjacent to that common pillar;

whereby in the event of a real-world accident those juxtaposed doors and the corresponding vehicular members are in a state of constrained deformation which is exploited to prevent those juxtaposed doors from popping open.

3. An increased stiffness of vehicle structure according to claim 1, wherein the interengaging assemblies of the vehicular couple operate in at least two planes thus enormously cutting assembly time associated with allowing small tolerances larger than the permissible tolerances.

4. An increased stiffness of vehicle structure according to claim 2, wherein the interengaging assemblies of the vehicular couple operate in at least two planes.

5. An increased stiffness of vehicle structure according to claim 1, wherein the vehicle roof is provided with at least one transverse girder **(17.2a, 17.2d, 17.2e, 17.2f, 17.2g)**, connecting the pillar of one vehicle side to the pillar of the other vehicle side.

6. An increased stiffness of vehicle structure according to claim 5, wherein at least two hooks **(15.6)**, serving as the receptacles, are mounted to the window-guide channels **(6.1a, 6.2a, 6.3, 6.4 or 6.1aB, 6.2aB, 6.3B, 6.4B)** of the vehicle door and a mating rod **(17.1d)**, serving as the key, is arranged along the vehicle roof and mounted to the transverse girders **(17.2e, 17.2f, 17.2g)**.

7. An increased stiffness of vehicle structure according to claim 6, wherein at least two hooks **(15.6)**, serving as the receptacles, mounted to the window-guide channels **(6.1a, 6.2a, 6.3, 6.4 or 6.1aB, 6.2aB, 6.3B, 6.4B)** of the vehicle door and a mating rod **(17.1d)**, serving as the key, arranged along the side rail and mounted to transverse girders **(17.2e, 17.2f, 17.2g)**, connecting the pillars of both vehicle sides to each other.

8. An increased stiffness of vehicle structure according to claim 1, wherein at least two hooks **(15.6)**, serving as the receptacles, mounted to the window-guide channels **(6.1a, 6.2a, 6.3, 6.4 or 6.1aB, 6.2aB, 6.3B, 6.4B)** of the vehicle door and a mating rod **(17.1d)**, serving as the key, arranged along the side rail and mounted to transverse girders **(17.2e, 17.2f, 17.2g)**, connecting the pillars of both vehicle sides to each other.

9. An increased stiffness of vehicle structure according to claim 5, wherein the key **(15.1)** is bolted to an intersection region of the pillar and vehicle roof, which is reinforced by a plate **(17.1c)** and the transverse girder **(17.2d)** and

the mating hole is arranged to the window-guide channel **(6.1a, 6.2a, 6.1aB, 6.2aB)** of the vehicle door.

10. An increased stiffness of vehicle structure according to claim **5**, wherein
the keys **(15.2a, 15.2)** are bolted to the respective window-guide channels **(6.1a, 6.2a, 6.3, 6.4, 6.1aB, 6.2aB, 6.3B, 6.4B)** of the vehicle door and
the mating holes are arranged to the vehicle roof **(17)**, reinforced by a plate **(17.1, 17.1a)** and the transverse girder **(17.2a)**.

11. An increased stiffness of vehicle structure according to claim **5**, wherein
the keys **(15.2, 15.4, 15.4a)** are mounted to the respective window-guide channels **(6.1a, 6.2a, 6.3, 6.4, 6.1aB, 6.2aB, 6.3B, 6.4B)** of the vehicle door and
the mating holes are arranged to the vehicle roof **(17)**, reinforced by a plate **(17.1a)** and the transverse girders, and to the side rail **(18)**, reinforced by a side-rail reinforcement member **(18.1, 18.1a)** and transverse girders **(18.2)**, connecting the pillars of both vehicle sides to each other.

12. An increased stiffness of vehicle structure according to claim **1**, wherein
the keys **(15.4, 15.4a)** are mounted to the respective window-guide channels **(6.1a, 6.2a, 6.3, 6.4, 6.1aB, 6.2aB, 6.3B, 6.4B)** of the vehicle door and
the mating holes are arranged to the side rail **(18)**, reinforced by a side-rail reinforcement member **(18.1, 18.1a)** and transverse girders **(18.2)**, connecting the pillars of both vehicle sides to each other.

13. An increased stiffness of vehicle structure according to claim **1**, wherein
the keys **(30, 32, 35)** are bolted to the reinforced flange **(21)** of the vehicle body **(20)** and
the mating holes are arranged to housings **(6.5, 6.5B)**, rigidly attached to the window-guide channels **(6, 6B)**, the door-reinforcement members **(6.6b, 6.7b, 6.8)** and the impact beams **(7, 7B)**, respectively.

14. An increased stiffness of vehicle structure according to claim **1**, wherein the key **(15.6)**, adjustable from outside the vehicle, comprises a bolt **(15.21)**, a number of spacers **(15.22)**, a washer **(15.24)**, a nut **(15.25)** and a hook **(15.6)** with interior diameter (d_1) and gap (s_1).

15. An increased stiffness of vehicle structure according to claim **14**, wherein the key, adjustable from outside the vehicle, comprises a bolt **(15.14)**, large washer **(15.13)** with outer diameter (D), a number of spacers **(15.12)** and a sleeve **(15.11)**, both have a total

length (l) and an outer diameter (d_R) when assembled, where the length of the key is adjusted by removing or adding the spacers or replacing the sleeve with one having an appropriate length, and the outer diameter thereof is adjusted by replacing the washer with one having an appropriate outer diameter and the spacer and sleeve are replaced by ones having an appropriate outer diameter.

16. An increased stiffness of vehicle structure according to claim **15**, wherein the sleeve **(15.11)** of the key with exterior diameter (d) is governed by an equation ($D \geq d \geq d_R$).

17. An increased stiffness of vehicle structure according to claim **15**, wherein a front region of the washer **(15.13)** has radial teeth.

18. An increased stiffness of vehicle structure according to claim **17**, wherein the washer is an integral part of the bolt.

19. An increased stiffness of vehicle structure according to claim **1**, wherein both ends of the U-shaped window-guide channel **(6, 6B)**, facing the lower portion of the vehicle body **(20)**, and an upper portion of that window-guide channel, facing the upper portion of the vehicle body **(20)**, accommodate the engaging members of the interengaging assemblies.

20. An increased stiffness of vehicle structure according to claim **19**, wherein both ends of the U-shaped window-guide channel **(6, 6B)** are connected to each other by a window-guide member **(6.4, 6.4B)**.

21. An increased stiffness of vehicle structure according to claim **1**, wherein the window-guide channels **(6.1, 6.2, 6.1B, 6.2B)** are rigidly attached to the respective stiff window-guide members **(6.1a, 6.2a, 6.1aB, 6.2aB)**.

22. An increased stiffness of vehicle structure according to claim **4**, wherein
the holes are arranged to the common pillar, reinforced by the pillar-reinforcement member **(23)** and
the mating keys **(33, 34, 36)** are bolted to the respective door-reinforcement members **(6.2a, 6.7a, 6.8)**, each of which is rigidly attached to the window-guide channel **(6, 6B)** and the impact beams **(1, 1B, 7, 7B)**.

23. An increased stiffness of vehicle structure according to claim **2**, wherein
the keys **(15.3, 15.3a)** are bolted to a pair of legs of the U-shaped pillar-reinforcement member **(17.3)** of the common pillar, reinforced by a plate **(17.1b)**, arranged along the

vehicle roof (17) and attached rigidly thereto and to a transverse girder (17.2c), connecting the common pillars of both vehicle sides to each other and the mating holes are arranged to the respective window-guide channels of the juxtaposed vehicle doors.

24. An increased stiffness of vehicle structure according to claim 2, wherein the keys (15.5, 15.5a) are bolted to a pair of legs of the U-shaped pillar-reinforcement member (18.3) of the common pillar, reinforced by a side-rail reinforcement member (18.1b), arranged along the side rail (18) and attached rigidly thereto and to a transverse girder (18.2), connecting the common pillars of both vehicle sides to each other and the mating holes are arranged to the respective window-guide channels of the juxtaposed vehicle doors.

25. An increased stiffness of vehicle structure according to claim 24, wherein a belt casing (26) is accommodated in the U-shaped pillar-reinforcement member (18.3).

26. An increased stiffness of vehicle structure according to claim 3, wherein the adjustable interengaging assemblies of the vehicle door (8) & the pillar operate in two planes, in which the keys (33, 34) are bolted to the window-guide channel and the door-reinforcement member (6.7a), rigidly attached to the window-guide channel (6) and the impact beams (1, 7), respectively; and the mating receptacles are arranged to the reinforced pillar.

27. An increased stiffness of vehicle structure according to claim 3, wherein the adjustable interengaging assemblies of the vehicle door (8, 8B) & the pillar, whereto the door frame is hingedly secured, operate in three planes, in which the keys (15.1, 30, 31, 35, 36) are rigidly arranged to the reinforced pillar and the reinforced flange (21) of the vehicle body (20), respectively; and the mating receptacles are arranged to the door-reinforcement member (6.6a, 6.8), a housing (6.5, 6.5B) and the window-guide channel (6.1a, 6.2a), respectively.

28. An increased stiffness of vehicle structure according to claim 3, wherein the interengaging assemblies of the vehicle door (8, 8B) & the vehicle roof (17) operate in four planes, in which the keys (15.2, 15.2a, 30, 32, 35, 37) are rigidly arranged to the respective window-guide channels (6.1a, 6.2a, 6.3, 6.4, 6.1aB, 6.2aB, 6.3B, 6.4B) and the reinforced flange (21) of the vehicle body (20), respectively; and

the mating receptacles are arranged to the reinforced vehicle roof **(17)** and that window-guide channels, respectively.

29. An increased stiffness of vehicle structure according to claim **1**, wherein a rear-door member **(6.5C)**, whose contour is adapted to the contour of the rear portion of an outer panel of the rear vehicle door, is rigidly attached to the window-guide channel **(6B)** and the impact beams **(1B, 7B)**.

30. An increased stiffness of vehicle structure according to claim **29**, wherein
the holes are arranged to the rear-door member **(6.5C)** and
the mating keys **(37)** are bolted to the rear flange **(21)** of the vehicle body **(20)**, reinforced by a flange-reinforcement member **(21.4B, 21.6B, 21.5B)**.

31. An increased stiffness of vehicle structure of a motor vehicle comprising
a main vehicle body **(20)** having at least one door aperture **(20.1, 20.1B, 20.1T, 20.1h, 20.1x)** therein;
a mating vehicle door **(8, 8B, 8T, 8h, 8x)**, generally representing a tailgate- **(8T)**, sliding side-, cargo-, liftgate door, trunk cover **(8x)**, hood **(8h)** or vehicle door **(8, 8B)**, whose door frame, hingedly secured to that vehicle body **(20)** for pivotal movement between an open and a closed position, is reinforced by door-frame members comprising at least two impact beams **(1, 7, 1B, 7B)**, spanning the door aperture, door-reinforcement members and at least one window-guide channel **(6, 6B, 6.1, 6.2, 6.1B, 6.2B, 6.1a, 6.2a, 6.1aB, 6.2aB)** to guide and receive a window pane; and
vehicular couples, consisting of
the vehicle door & a vehicle roof **(17)**,
the vehicle door & a side rail **(18)**,
the vehicle door & a pillar and
the vehicle door & a flange **(21, 21T, 21h, 21x)** of the vehicle body **(20)**,
at least one of which is equipped with interengaging assemblies, each of which includes a key, arranged to one vehicular member of the vehicular couple, facing the other vehicular member, and a mating receptacle located thereon, where the interengaging assemblies operate in at least two planes; and
adjusting mechanisms;
thus enormously saving assembly time resulting from work to adjust large clearances between the adjustable keys and the mating receptacles to small tolerances, when the vehicle door is closed, distributing impact energy to the respective vehicular members, lowering

stress thereof and preventing passengers from ejection out of the motor vehicle in the event of a real-world accident.

32. An increased stiffness of vehicle structure according to claim **31**, wherein the adjustable interengaging assemblies of the vehicle door **(8, 8B)** & the side rail **(18)** operate in three planes, in which

the keys **(15.4a, 30, 32, 35, 37)** are rigidly arranged to the side rail **(18)** and the reinforced flange **(21)**, respectively; and

the mating receptacles are arranged to housings **(6.5, 6.5B)**, the window-guide channels **(6.1a, 6.2a, 6.3, 6.4, 6.1aB, 6.2aB, 6.3B, 6.4B)** and a rear-door member **(6.5C)**, whose contour is adapted to the contour of the rear portion of an outer panel of the rear door, respectively.

33. An increased stiffness of vehicle structure according to claim **31**, wherein the interengaging assemblies of the juxtaposed vehicle doors & a common pillar thereof operate in many planes, in which

the keys **(15.3, 15.3a, 15.5, 15.5a, 33, 34, 36)** are rigidly arranged to the reinforced common pillar and the pillar-reinforcement members **(17.3, 18.3, 23)** thereof, respectively; and

the mating receptacles are arranged to the door-frame members.

34. An increased stiffness of vehicle structure according to claim **31**, wherein the interengaging assemblies of the vehicular couples operate in many planes, in which

the keys **(15.1 to 15.7, 30, 32, 35, 37)** are rigidly arranged to the reinforced pillar, reinforced vehicle roof, the reinforced side rail and the reinforced flange, respectively; and

the mating receptacles are arranged to the door-frame members.